

**Total Pages—4 4th SS—CHEM (Core-VIII)  
(Reg)**

**2019**

**CHEMISTRY**

**(Inorganic Chemistry-III)**

**[ Core ]**

**Paper – VIII**

**Full Marks : 60**

**Time :  $2\frac{1}{2}$  hours**

**Answer all questions**

***The figures in the right-hand margin indicate marks***

**GROUP – A**

**1. Answer all questions :  $3 \times 4$**

**(a) Write the IUPAC name of the following  
coordination compounds :**

**$[\text{Co}(\text{NH}_2)_2(\text{NH}_3)_4]\text{OC}_2\text{H}_5$  and  $\text{Fe}_4[\text{Fe}(\text{CN})_6]_3$**

**4-3**

**(Turn Over)**

(b) Why most of the transition metals are paramagnetic ? Explain.

(c) Name the elements in the first transition series with their atomic number.

(d) Write short note on the enzyme carboxy peptidase.

**GROUP – B**

**Answer all questions**

2. (a) Gives the postulates of Werner's coordination theory. 8

(b) Explain the isomerism in diammine dichloride platinum (II). 4

*Or*

(a) What are labile and inert complexes ? Both the terms Labile and inert are relative. Explain the rule which helps to explain them. 8

(b) Write a notes on geometrical isomers in coordination compounds of coordination number-4. 4

( 3 )

3. (a) What are transition elements ? Discuss the various valencies complex formation of these elements with examples. 10

(b) Write the electronic configuration of Cu-29. 2

Or

(a) "Although the number of electrons in the outer-most level in transition elements is the same (as 1 or 2) as in alkali and alkaline earth metals, yet the transition elements are much less reactive." How would you account for it ? 8

(b) Explain with reason why compounds of transition metals are generally coloured ? 4

4. (a) How would you account for + 2, + 3 and + 4 oxidation states of Titanium ? Which of these state is most stable and why ? 6

(b) How does Titanium occurs in nature ? Discuss the general chemical behaviour. 6

( 4 )

Or

Q1 (a) Discuss the general chemical behaviour of vanadium. How does vanadium react with strong oxidising acid, molton alkalies at elevated temperatures ? 6

(b) What are the properties of chromium ? Which account for its wide spread use in chromium plating ? Discuss briefly chrome-plating. 6

5. (a) What is meant by Lanthanide contraction ? Give causes and consequences of Lanthanide Contraction. 6

(b) Describe ion-exchange process to separate Lanthanides. 6

Or

(a) Discuss the biological role of Mercury, Lead, Cadmium in details. 6

(b) Explain the chemistry of separation of Neptunium, Plutonium and Americium from Uranium. 6

Total Pages—4

4th SS—CHEM(Core-IX)  
(Reg)

2019

**CHEMISTRY**

( *Organic Chemistry - III* )

[ Core ]

Paper – IX

*Full Marks : 60*

*Time :  $2\frac{1}{2}$  hours*

**Answer all questions**

*The figures in the right-hand margin indicate marks*

**GROUP – A**

1. Answer all questions :  $3 \times 4$
- (a) How can you distinguish  $1^\circ$ ,  $2^\circ$  and  $3^\circ$  amines using Hinsberg's reagent ?
- (b) How can you prepare benzene from benzene diazonium chloride ?

( Turn Over )

( 2 )

(c) Compare the basic character of pyrrole and pyridine.

(d) What are alkaloids ? Give two biological action of alkaloids.

### GROUP – B

Answer all questions :

2. (a) Discuss the reduction of nitrobenzene in differet medium. 6

(b) Discuss the effect of substituents and solvent on Basicity of amines. 6

Or

Write notes on the following : 4 × 3

(i) Hoffmann's exhaustive methylation

(ii) Mannich reaction

(iii) Carbyl amine reaction.

3. (a) Explain any two methods of preparation of phenanthrene. 6

(b) Write notes on :

3 x 2

(i) Sandmeyer reaction

(ii) Coupling reaction.

*Or*

How benzene diazonium chloride is prepared from aniline ? Discuss the synthesis of fluoro-benzene, biphenyl and para-hydroxy azobenzene from benzene diazonium chloride. 3 + 3 + 3 + 3

4. How will you synthesise Isoquinoline by the following :

(a) Pictet-Spengler synthesis.

(b) Pomeranz-Fritsch synthesis

What are the oxidation products of Isoquinoline ?

4 + 4 + 4

*Or*

Discuss the synthesis of Thiophene from

( 4 )

furoic acid and acetylene. How does it reacts with : 3 + 3 + 3 + 3

- (a) Formaldehyde in HCl
- (b) Bromine.

5. Elucidate the structure of Hygrine and confirm the structure by synthesis. Discuss its medicinal importance. 10 + 2

*Or*

Establish the structure of  $\alpha$ -terpinene along with its synthesis. 12

Total Pages—4

4th SS—CHEM(Core-X)  
(Reg)

2019

CHEMISTRY

(Physical Chemistry-IV)

[Core]

Paper - X

Full Marks : 60

Time :  $2\frac{1}{2}$  hours

Answer all questions

The figures in the right-hand margin indicate marks

GROUP - A

1. Answer the following :  $3 \times 4$

(a) Explain on electrolysis of aq. solution NaCl give H<sub>2</sub> and Cl<sub>2</sub> but K<sub>2</sub>SO<sub>4</sub> give H<sub>2</sub> and O<sub>2</sub> at their respective electrode.

(Turn Over)

(b) Define Diamagnetism and Paramagnetism.

(c) Explain the conductance of the strong electrolyte increases on dilution although the degree dissociation ( $\alpha$ ) always equal to one at any dilution.

(d) How does the ionic product of water is determined by conductance measurement ?

### GROUP – B

Answer all questions

2. Derive the Nernst equation for the given electrochemical cell. From emf measurement deduce the free energy, enthalpy and entropy of a cell reaction. 4 + 8

Or

Write notes on : 4 × 3

(i) Faraday law of electrolysis

(ii) Electrochemical series

(iii) Quinone-Hydroquinone electrode.

3. What do you mean by liquid junction potential. How does it determined and how does it is eliminated ? 2 + 8 + 2

*Or*

Write notes on : 6 + 6

(i) Molecular polarizability

(ii) Magnetic susceptibility.

4. Define specific conductance, equivalent conductance and molar conductance. How does these conductances are related. The resistance of 0.01 (N)  $\text{Al}_2(\text{SO}_4)_3$  electrolyte is  $0.001 \text{ ohm}^{-1}$  having cell constant  $0.01 \text{ cm}^{-1}$ . Calculate it molar constance. 6 + 3 + 3

*Or*

Derive the Debye-Hückle equation for strong electrolyte and discuss its limitation. 12

5. What do you mean by transport number ? How does it relate with ionic mobilities. Determine the transport number by Hittorf method. 2 + 2 + 8

(4)

Or

How does conductance of an electrolyte is determined ? Discuss the various kinds of conductometric titrations. 6 + 6

Total Pages—4

4th SS-PHY (GE-IV)  
(Reg)

2019

PHYSICS

(Electricity, Magnetism and EMT)

[ Generic Elective ]

Paper – IV

Full Marks : 60

Time :  $2\frac{1}{2}$  hours

Answer all questions

*The figures in the right-hand margin indicate marks*

SECTION – A

1. Answer all questions:

$3 \times 4$

(a) State Gauss-divergence theorem.

(b) Define 1 volt of electric potential. What is the difference between volt and stat volt?

( Turn Over )

(c) Define magnetic permeability and susceptibility.

(d) How the electric displacement vector related with electric field strength ?

### SECTION – B

Answer all questions

2. (a) Define gradient of a scalar field and prove that gradient of a scalar field is a vector field. If  $\vec{F} = x\hat{i} - y\hat{j} + z^2\hat{k}$  then find  $\int_C \vec{F} \cdot d\vec{r}$  from  $t=0$  to  $t=1$ . If curve  $C$  is given by  $x=t$ ,  $y=t^3$ ,  $z=t^2$  and  $\vec{r} = x\hat{i} + y\hat{j} + z\hat{k}$ .  $2 + 5 + 5$

Or

(b) What is meant by curl of a vector field ? What is its physical significance ? Prove that curl grad  $\phi = 0$ .  $3 + 4 + 5$

3. (a) What do you mean by Electric flux ? When the flux will be positive, negative or zero ?

State Gauss law of electrostatics and prove it when the charge is situated inside the surface. 3 + 3 + 6

*Or*

(b) Find an expression for the capacity of a cylindrical condenser. Find the total capacity when two capacitors of capacities  $400 \mu\text{F}$  and  $0.3 \text{ mF}$  are connected in series. 9 + 3

4. (a) Derive an expression for Ampere's circuital law. Using Ampere's circuital law show that  $\text{curl } \vec{B} = \mu_0 \vec{J}$ . 8 + 4

*Or*

(b) What do you mean by self induction and mutual induction? Find an expression for the mutual induction of two long solenoids. 3 + 3 + 6

5. (a) What is the equation of continuity? Show that equation of continuity,  $\text{div } \vec{J} + \frac{\partial \rho}{\partial t} = 0$  is contained in Maxwell's equations. 8 + 4

(4)

Or

(b) What is plane electromagnetic wave? How are values of  $E$  and  $B$  are related in it? 6 + 6

Total Pages—3

4th SS—CHEM(SEC-II)  
(Reg)

2019

**CHEMISTRY**

*(Pharmaceutical Chemistry)*

[ SEC ]

Paper —II

Full Marks : 40

Time : 2 hours

Answer all questions

*The figures in the right-hand margin indicate marks*

**GROUP — A**

1. Answer all the questions :  $2\frac{1}{2} \times 4$

(a) What are antipyretic agents. Give two examples.

(b) What are meant by central nervous system agents, explain with at least one example.

( Turn Over )

(c) Explain antiviral agents with suitable examples.

(d) Briefly discuss on 'antibiotics'.

**GROUP - B**

Answer all questions :

2. What are antifungal agents. Discuss their general mode of action and synthesis of any one such agent. 3 + 2 + 5

Or

Write notes on : 5 + 5

(i) Cardiovascular

(ii) antileprosy drugs

3. Give notes on : 5 × 2

(i) HIV-AIDS related drugs

(ii) Anti-bacterials.

*Or***Give a detailed account of chloramphenicol. 10**

4. What do you mean by aerobic and anaerobic fermentation? How can you produce ethanol and citric acid. 5 + 5

*Or***Mention synthesis of: 5 + 5**

- (i) Penicillin
- (ii) Vitamin-C.